COCHRAN BOILERS

Combined Catalogue.

A Land. **B** Marine.

ABRIDGED EDITION.

September, 1925.

STANDARD COAL AND OIL-FIRED BOILERS.

COCHRAN & CO., ANNAN, LIMITED,
ANNAN, SCOTLAND.

COCHRAN PATENT VERTICAL MULTITUBULAR BOILERS

(Invented in 1878).

CLASS A

(For Land Use).

CLASS B

(For Marine Use).

This Catalogue Cancels all previous issues, is known as the "Combined Catalogue (September, 1925)," and is a temporary issue. Any further details required will be freely furnished on application.

ABRIDGED EDITION.

September, 1925.

All Prices F.O.R. Great Britain.

F.O.B. or C.I.F. Particulars on Application.

For Shipping Specifications see page 26.

Section 1 ..... Coal Fired—Class A and B.

Section 2 ..... Oil ,, ,, ,,

PLEASE NOTE

THE COCHRAN WAY OF DOING BUSINESS.

COMMISSION. We only pay commission to our Agents.

PRICES. We always quote a "firm" price.

DELIVERY. We do all in our power to give deliveries as promised, and we expect our customers, on their part, to abide by the arrangements—storage capacity being limited.

TERMS OF PAYMENT. To give our customers the advantage of quick deliveries we are compelled to keep a large stock of Boilers. This necessitates prompt payments.

GUARANTEE. We undertake to replace any part which may prove defective in material or workmanship if returned to our Works within six months of delivery, subject to the goods having been treated with reasonable care.

COCHRAN & CO., ANNAN, LIMITED,
ANNAN, SCOTLAND.

HEAD OFFICE AND WORKS—

ANNAN, SCOTLAND.
Telegrams—"MULTITUBE, ANNAN"
Telephone—ANNAN, 111 & 112.

LONDON OFFICE—

137 VICTORIA STREET, S.W. 1.
Telegrams—"MULTITUBE, SOWEST."
Telephone—VICTORIA, 9341 (3 Lines).

NEWCASTLE OFFICE—

PRUDENTIAL BUILDINGS,
MOSLEY STREET.
Telegrams—"MULTITUBE,
NEWCASTLE-ON-TYNE"
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WARWICK CHAMBERS,
20 WEST CAMPBELL STREET
Telegrams—"MULTITUBE, GLASGOW."
Telephone—CENTRAL, 4209.

SHEFFIELD OFFICE—

74 HADFIELD STREET, WALKLEY,
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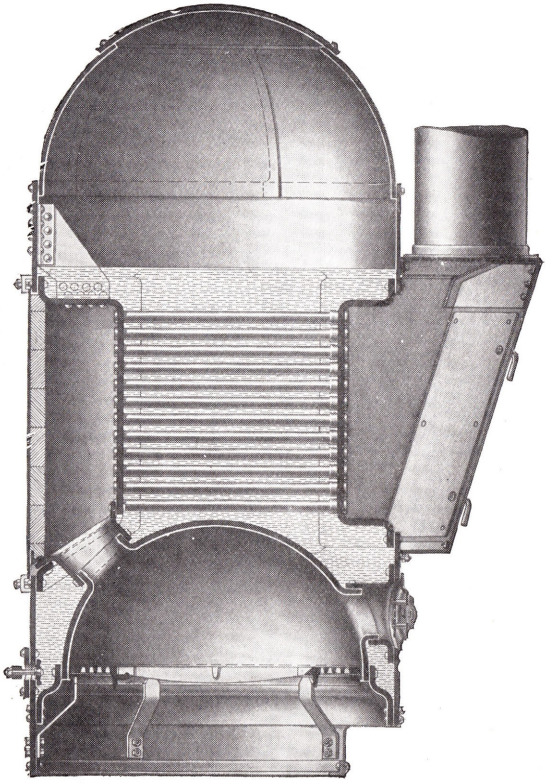
CARDIFF OFFICE—

11 EARLE PLACE, CANTON, CARDIFF.



SECTION OF STANDARD COCHRAN BOILER

Cochran Patent Vertical Multitubular Boilers.

COMBINED CATALOGUE (September, 1925).

INTRODUCTION.

Advantages and Special Features of the Cochran Boiler.

The Cochran Patent Boiler is a Vertical Boiler, and, in common with all Vertical Boilers, it possesses these most important advantages :

ECONOMY OF FLOOR SPACE.
IT DOES NOT REQUIRE ANY BRICKWORK SETTING.

All that is required is to set it on a hard, level surface, and it is ready for work. (See Illustration on page 8).

In addition to these advantages, it has also the following :—By its special arrangement of Horizontal Flue Tubes it has a large heating surface, thereby combining the advantages of the Vertical Boiler with the Economy of the Locomotive or Multitubular Boiler. At the same time it is wholly accessible for cleaning and examination inside (see coloured plate)—an advantage not usually possessed by other types of Multitubular Boilers. This is a point of extreme importance when only impure water is obtainable.

Every Stock Cochran Boiler is built under Lloyd's Survey, but Special Boilers are constructed and tested in accordance with the rules of the particular survey specified.

The Patent Hemispherical Seamless Furnace is pressed from one plate, and is therefore the strongest possible structure.

The Cochran Boiler can be kept thoroughly clean inside, and consequently its efficiency is always maintained, and repairs seldom, if ever, necessary. Its construction is clearly shown opposite.

Experience leads us to assert confidently—

1. That it is more economical than any other boiler made.
2. That it is more durable and reliable than any other boiler.
3. That it is the easiest boiler to set to work, and the most economical to maintain.
4. That it is safer from explosion than any other boiler.
5. That it is the best made, and in the long run, the cheapest boiler in the market.

Send for our Special Leaflets—"Internal Accessibility," "Efficient Heating" (dealing with the Cochran Hot Water Boiler), "Gas Firing," &c.

ON FUELS.

The Cochran Boiler is eminently suitable for burning any class of fuel, and the following notes may prove of interest as illustrating its many successful applications.

COAL is the best and most suitable solid fuel when it can be procured at a reasonable price. Its calorific value varies considerably, and this fact must be borne in mind when comparing the required evaporation with the figures given in this pamphlet for the 22 sizes of Cochran Boilers (page 11).

COKE, when dry, makes an excellent fuel, but customers would be well advised to ensure that their supplies are as free from dirt and incombustible matter as possible. With poor quality Coke the fire falls away rapidly unless frequently cleaned. The hemispherical seamless furnace and other constructional features of the Cochran Boiler secure for it a great advantage over other types of vertical boilers in respect of this fuel.

With good clean, unbroken Coke an evaporation approaching that given in our easy steaming columns for Coal on page 11 is possible, though it must be understood that it is desirable to fit longer funnels than our standard lengths as shown in the Table on page 12.

Coke Breeze and other Inferior Fuels can be utilized to advantage when procurable, but for the best results a special Forced Draught Grate is essential.

WOOD, when dry, is also a good fuel, but being lighter and more bulky than coal it burns at a quicker rate. It has a lower calorific value than either coal or coke, but does not yield the same quantity of clinker or ash.

Boilers of somewhat special design, in respect of furnace capacity, and with a specially large firehole, can be made and quoted for, and with the necessary draught (*e.g.*, a steam jet) and good dry wood will give an evaporation approaching the steaming figures shown on page 11. Particulars of such boilers will be gladly supplied on request. In fixing the size, however, of a Standard Cochran Boiler taken from Stock to burn wood fuel, a safe rule is to allow for a Boiler 33⅓ per cent. larger than for coal.

GAS.—(a) "Producer" Gas can be burnt in boilers with satisfactory results, but it is doubtful if the same efficiency can be obtained as would result from the combustion of an equal quantity of solid fuel in the furnace of the boiler.

(b) Town's Gas.—For the utilization of this fuel the Cochran Boiler has proved to be ideal after the necessary constructional alterations have been made for its adaptation to gas-firing. The form of the combustion chamber, in which the usual grate for solid fuel is replaced by a refractory bed, is excellently adapted for the application of surface combustion to steam raising. In the Woodall-Duckham-Cochran Gas-fired Boiler the upper part consists of two or three passes of fire tubes of small diameter, such being essential for the efficient combustion of Town's Gas. The advantage of this fuel for certain industries situated in towns will be obvious to those who consider the little attention necessary with a unit capable of such exact regulation as the Cochran Automatic Gas-fired Boiler. Further, as compared with solid fuel, the problems of fuel transportation, storage, smoke, and dirt do not present themselves, and this fact compensates to no small degree the present commercial price of Town's Gas.

OIL, where procurable at a reasonable price, makes a thoroughly suitable fuel for steam boilers. Various systems for burning oil are upon the market, varying both in efficiency and price. The more expensive apparatus give a higher efficiency, and are used where the cost of oil is high. Very effective and cheap steam apparatus can be used on the oil fields and places where oil is plentiful.

It should be emphasised that with Oil Fuel higher evaporations are obtained than with Coal, and numerous trials on Oil-fired Cochran Boilers have shown that between 13 and 14 lbs. of steam per lb. of oil can easily be obtained. See Section 2 for particulars of Prices, Evaporations, Weights, &c., of Oil-fired Cochran Boilers.

SUNDRY FUELS.—Bagasse (sugar-cane refuse), sawdust, rice husks, and various kinds of refuse necessitate the use of specially built external grates.

With particular regard to rice, or "Paddy" husk, a large number of Cochran Boilers have been installed in the rice mills of Burma and elsewhere. They are invariably mounted on a brickwork furnace, forming an extension to the boiler furnace, and a special step grate (made locally) instead of the ordinary grate consumes the husk, which is fed continuously by means of a hopper and chute through the normal firedoor. This application of the Cochran Boiler has proved an outstanding success, and users enjoy the great advantage of durability and efficiency such as cannot be approached by any other type of vertical boiler.

WASTE GASES FROM FURNACES.—The Cochran Boiler is specially suitable for utilizing the waste heat from re-heating furnaces in Forges and Rolling Mills, also Puddling furnaces. There are many examples of Cochran Boilers utilizing waste heat in the Sheffield district, demonstrating yet another important application of our boiler. Its great durability and certainty in action, the effective heating surface and large thermal storage capacity makes it the safest vertical boiler for the raising of steam from furnace waste gases. The technical considerations of the problem, namely, The Volume and Temperature of the Available Gases, are outlined in our Pamphlet, "The Utilization of Waste Heat."

GENERAL.—This Catalogue deals essentially with Standard Coal and Oil-fired Cochran Boilers. The variety of its successful applications in industry and heating schemes is very great, and the Cochran Hot Water Boiler in particular might be mentioned. This is dealt with very briefly on page 28.

ON LAGGING.

To get the most satisfactory results from any type of boiler, whether erected in the open or under cover, it is essential that it should be effectively lagged, *i.e.*, covered with some kind of non-conducting material to prevent loss of heat by radiation, which may in some cases be as high as 10% of the total heat generated.

Boilers may be lagged with various materials, but Asbestos Composition is the best and cheapest in the long run. It is usually applied about 2″ thick, and it is excellent practice to have angle irons fitted to the boiler to hold the lagging in place and perforated for attaching wire netting. This netting should be wrapped round the boiler before the last coat is applied. We do not recommend the lagging of the combustion chamber plate, although, if desired, this could be done effectively by means of a readily portable asbestos mattress. Lagging should be applied in such a way as to leave the boiler shell at the flanges of the mountings exposed. This is of the utmost importance, to avoid corrosion through leakage at joints. We would recommend all customers to employ the services of an expert boiler lagger, and get him to supply the material.

The following table shows the prices of Angle Irons, Distance Pieces, Steel Pads, and Galvanised Steel Sheeting, all of which can be supplied to effect high-class lagging :—

Size No. of Boiler.	3	4	5	6	Size No. of Boiler.	1	2	3	4
	Angle irons for holding lagging 2 in. thick.	Distance pieces for water gauge, test cocks, & pressure gauge cock.	Steel pads for stop valve, safety valve, blow-off & feed check.	Galvanised steel sheeting.		Angle irons for holding lagging 2 in. thick.	Distance pieces for water gauge, test cocks, & pressure gauge cock	Steel pads for stop valve, safety valve, blow-off & feed check	Galvanised steel sheeting
	£	£	£	£		£	£	£	£
1	10	4	11	16	12	14	5	14	47
2	10	4	11	18	13	14	5	14	47
3	11	4	11	21	14	14	5	14	47
4	11	4	12	23	15	15	5	15	50
5	11	5	12	26	16	15	5	15	50
6	12	5	12	28	17	15	5	15	50
7	12	5	12	29	18	16	5	15	52
8	12	5	13	42	19	16	5	15	52
9	13	5	13	43	20	18	5	15	56
10	13	5	13	45	21	18	5	16	59
11	14	5	14	46	22	20	5	16	62

NOTE.—The prices in Col. 4 for Galvanised Steel Sheeting are for the Sheeting only. Angle Irons at the prices shown in Col. 1 are required to hold the Sheeting to boiler. See Subsequent Tables for Dimensions (Height, Diameter and Heating Surface) of the 22 sizes of Boilers referred to above.

SAVING OF SPACE AND BRICKWORK.

A practical illustration of the saving of space effected by the installation of a 7′ 0″ dia. COCHRAN BOILER in a Laundry near London, in place of two Cornish Boilers and an Economiser. The Boiler is in position ready for work after the removal of one Cornish Boiler and the Economiser, and pending the removal of the second built-in boiler.

MOUNTINGS AND ACCESSORIES.

Too much importance cannot be attached to the Fittings and Mountings on a boiler. However good a boiler may be there will be nothing but trouble unless the Mountings are of a good, heavy type, and of suitable size and description for the boiler to which they are fitted.

For feeding the boiler the most satisfactory arrangement is a feed pump, except for the smallest sizes, when an injector is usually adopted.

Below are enumerated the Standard Mountings as fitted to all sizes of Cochran Boilers.

They are not light, highly-polished articles, but are good, heavy Mountings, designed for continual work and a reasonable amount of rough usage.

Stop Valve.—Cast-iron body with gun-metal valve, spindle, and seat. Right angle type, with bridge and external screw.

Class A Safety Valve.—Open lever type, cast-iron body, with gun-metal valve and seat Wrought-iron lever with cast-iron weight.

Class B Safety Valve.—Double enclosed spring type, with easing gear, cast-iron body, gun-metal valves, seats, and spindles.

Feed Check Valve and Shut-off Valve combined.—Gun-metal throughout. The valve covers are bolted on, and are arranged with spindles screwed through external bridges. Iron pipe is fitted inside the boiler to distribute the feed water. On boilers 3′ 9″ dia. and under the valve covers are screwed into the body of the valve, and the spindles are screwed through the covers.

Blow-off Cock or Valve.—Of gun-metal throughout.

Water Gauge.—Gun-metal, asbestos packed. Screwed ends to screw into boiler, and fitted with back nuts. Suitable protector fitted on Class A Boilers.

Test Cocks.—Gun-metal, asbestos packed, with back nuts.

Salinometer Cock (Class B Boilers only).—Gun-metal, asbestos packed, with back nuts.

Pressure Gauge.—Complete with cock on boiler and copper pipe connected to pressure gauge, which is attached to bracket on side of smoke-box. (On Boilers 4′0″ dia. and under, a W.I. syphon and cock is fitted.)

NOTE.—All Mountings are tested by hydraulic pressure to 200 lbs. per square inch, and are tried under steam on the boiler to which they are fitted.

INJECTORS.

The injector we generally fit is of the one-movement type. It is included in the prices as given in Specification No. 1.

The following specification comprises a full set of injector fittings as supplied: —Steam cock or valve on boiler, steam pipe to injector, injector, suction pipe (about 2 or 3 ft.), injector overflow pipe.

The injectors will lift water a few feet, but all injectors work best with a head of water, and the water should be cold.

FEED PUMPS.

The type of Feed Pump as supplied with our Standard Boilers under Specification No. 2 is of the duplex type, heavily constructed, and of ample size to feed boiler while running at a low speed. The water chambers are fitted with gun-metal liners.

The following specification comprises a full set of pump fittings as supplied :—Pump, steam cock or valve on boiler, steam pipe to pump, exhaust steam pipe, steam valve on pump, delivery pipe to boiler, pet cocks and lubricator on pump, set of spanners for pump, bracket on boiler for holding pump.

NOTE.—When ordering Spares for existing Cochran Boilers, the boiler number shown on the plate near the firedoor should always be quoted to avoid correspondence and delay.

GENERAL.

The following notes may prove of interest to the prospective buyer of a boiler, but for further information and fuller details of the construction and working of the Cochran Boiler please write for our "Notes on Up-to-Date Boiler Practice."

General Data for Fixing Size of Boiler for any purpose.—It is of the utmost importance, before installing a boiler, to make certain that the right size has been selected. Too small a boiler is a source of perpetual worry, whereas too large a boiler is apt to be extravagant.

The following figures may be taken as a rough guidance for average conditions :—

1 sq. ft. of heating surface should evaporate about 5 to 7 lbs. of water per hour.
1 lb. of good steam coal should evaporate about 7 to 8 lbs. of water per hour.
About 30 lbs. of steam are required for one indicated horse-power per hour.
About 20 lbs. of fuel can be consumed per square foot of grate per hour.

Best Conditions for Working Boilers.—The evaporation or performance of a boiler depends largely upon the conditions under which it is being worked. The best conditions may be briefly summarised thus :—

1. The fuel should be of good quality, and the stoking should be regularly and carefully attended to.
2. The feed water should be as pure as possible, and be fed continuously into the boiler. If the feed can be warmed by the exhaust steam or other means a considerable economy of fuel is attained.
3. The boiler should be kept clean inside, and free from scale.
4. The boiler should be carefully protected against the weather by being lagged (see page 7) or protected by a suitable building.
5. Where possible it is an advantage to erect the boiler on a ring of double bull-nosed bricks. This keeps the bottom of the shell clear of wet ashes or water and prevents corrosion.
6. It is most important that there should be a good draught in the furnace to consume the fuel properly. Chimneys should be as straight as possible, and of ample diameter. On page 12 will be found the standard dimensions for Class A Cochran Boilers, and while the heights have been fixed to give a good average result, the tallest possible chimney is the best policy for easy handling of the boiler. The ashpit damper is a means of draught regulation, but in cases where bends are involved especially, customers would be well advised to have a Butterfly Damper fitted. The smokebox of the Cochran Boiler enables it to be installed in almost any position relative to an existing system of flues by means of specially designed bends, thus dispensing with the standard funnels, *e.g.*, in certain cases where a brick stack exists.

EVAPORATION OF COCHRAN BOILERS.

THE following table gives the evaporation of Standard Coal-fired Cochran Boilers **FROM AND AT 212° F.** The figures given in Column (10) can be obtained under favourable conditions, *i.e.*, with skilled attendance, good coal, and a chimney of length given on page 12. Where cheapness in first cost is the principal consideration the figures in Column (10) should be taken. Where there is no guide as to the conditions, a margin of 10% should be allowed to cover time for cleaning of fires and tubes, &c.

Where it is known that Economy of Labour and Coal are of greater importance than first cost, the figures in (15) should be taken.

When working at 75% of maximum evaporation it is estimated that coal consumption would be about 60% of maximum, and water evaporated per lb. of coal would be about 25% higher. The figures shown under EASY STEAMING embody these assumptions.

No.	PARTICULARS OF BOILER.					HEAVY STEAMING.					EASY STEAMING.					No.
						Coal.		Evaporation.			Coal.		Evaporation.			
	Dia. of Boiler.	Height of Boiler.	Grate Area.	Heating Surface.	Ratio H.S. / G.A.	Lbs. per hour.	Lbs. p. sq. ft. of Grate p. hr.	Per Lb. Coal.	Per sq. ft. H.S. p. hr.	Total per hour.	Lbs. per hour.	Lbs. p. sq. ft. of Grate p. hr.	Per Lb. Coal.	Per sq. ft. H.S. p. hr.	Total per hour.	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	**10.**	11.	12.	13.	14.	**15.**	
	Ft. In.	Ft. In.	Sq. Ft.	Sq. Ft.												
1	3 0	6 9	4·75	60	12·6	72	15·1	6·0	7·2	430	43	9·5	7·5	5·3	320	1
2	3 3	7 6	5·75	80	14·0	98	17·0	6·1	7·5	600	58	10·0	7·8	5·6	450	2
3	3 9	8 6	7·50	100	13·3	144	19·3	5·9	8·4	840	86	11·5	7·6	6·5	650	3
4	4 0	9 0	8·50	120	14·1	170	20·0	6·0	8·5	1020	102	12·0	7·6	6·5	780	4
5	4 3	9 6	9·25	140	15·1	188	20·4	6·4	8·6	1200	112	12·0	8·1	6·4	900	5
6	4 6	10 0	9·75	160	16·4	202	20·8	6·5	8·3	1320	121	12·4	8·3	6·2	1000	6
7	4 9	10 3	11·75	200	17·0	253	21·6	6·7	8·4	1680	151	12·5	8·4	6·3	1260	7
8	5 0	11 3	12·50	220	17·6	273	21·8	6·7	8·3	1820	163	13·0	8·5	6·3	1380	8
9	5 3	11 9	14·00	250	17·8	312	22·4	6·8	8·4	2100	187	13·3	8·5	6·3	1580	9
10	5 6	12 3	16·75	300	17·9	383	22·7	6·8	8·7	2600	229	13·6	8·5	6·5	1950	10
11	5 9	13 0	18·75	350	18·7	435	23·3	6·9	8·6	3000	261	13·9	8·6	6·5	2250	11
12	6 0	12 6	18·75	350	18·7	435	23·3	6·9	8·6	3000	261	13·9	8·6	6·5	2250	12
13	6 0	13 6	18·75	350	18·7	435	23·3	6·9	8·6	3000	261	13·9	8·6	6·5	2250	13
14	6 0	14 0	18·75	400	21·4	435	23·3	7·1	7·8	3100	261	13·9	9·2	6·0	2400	14
15	6 6	13 6	22·50	450	20·0	533	23·7	7·0	8·3	3700	319	14·1	8·8	6·2	2800	15
16	6 6	14 0	22·50	450	20·0	533	23·7	7·0	8·3	3700	319	14·1	8·8	6·2	2800	16
17	6 6	14 6	22·50	500	22·2	533	23·7	7·5	8·0	4000	319	14·1	9·4	6·0	3000	17
18	7 0	14 0	26·75	500	18·7	643	24·0	6·7	8·6	4300	385	14·3	8·6	6·6	3300	18
19	7 0	15 0	26·75	600	22·4	643	24·0	7·5	8·0	4800	385	14·3	9·4	6·0	3600	19
20	7 6	16 3	31·50	750	23·8	767	24·3	7·7	7·9	5900	460	14·6	9·6	5·9	4400	20
21	8 0	16 6	37·00	850	23·0	906	24·5	7·5	8·0	6800	543	14·6	9·6	6·1	5200	21
22	8 6	17 0	41·00	1000	24·4	1004	24·5	7·8	7·9	7900	602	14·6	9·8	5·9	5900	22

LIST OF STANDARD SIZES.

No.	Dia.		Height.		Heating Surface.	Grate Area.	Tubes.		Funnel.		Approximate Evaporation. From cold feed 50° Fah.		Approx Weight without Water		Weight of Water at Working Level Cold	No.
							No.	Ex. Dia.	Dia.	Height Recommended.	Maximum Steaming.	Easy Steaming.	Bare Boiler, including Back Plate and Lining, Angle Ring, & Brackets for Firebars	Complete with Mountings, but no Funnel		
	Ft.	In.	Ft.	In.	Sq. Ft.	Sq. Ft.		In.	In.	Ft.	Lbs. per hr.	Lbs. per hr.	Cwts.	Cwts.	Cwts.	
1	3	0	6	9	60	4·75	23	2½	9	11	360	270	23	29	8·9	1
2	3	3	7	6	80	5·75	23	2½	10	12	500	370	25	33	10·3	2
3	3	9	8	6	100	7·50	37	2½	11	13	700	540	32	41	16·9	3
4	4	0	9	0	120	8·50	42	2½	12	14	850	650	41	51	20·5	4
5	4	3	9	6	140	9·25	58	2½	13	15*	1000	750	45	54	23·6	5
6	4	6	10	0	160	9·75	65	2½	14	16	1100	820	50	60	30·3	6
7	4	9	10	3	200	11·75	74	2½	15	18	1400	1050	58	71	33·9	7
8	5	0	11	3	220	12·50	84	2½	16	20	1520	1150	65	78	40·6	8
9	5	3	11	9	250	14·00	92	2½	17	22	1760	1320	73	88	43·6	9
10	5	6	12	3	300	16·75	102	2½	18	24	2160	1620	82	98	50·0	10
11	5	9	13	0	350	18·75	123	2½	20	26	2500	1880	95	114	56·0	11
12	6	0	12	6	350	18·75	110	2½	21	28	2500	1880	96	115	62·2	12
13	6	0	13	6	350	18·75	110	2½	21	28	2500	1880	100	118	62·2	13
14	6	0	14	0	400	18·75	136	2½	21	28	2600	2000	107	127	63·3	14
15	6	6	13	6	450	22·50	143	2½	24	30	3100	2360	116	140	73·2	15
16	6	6	14	0	450	22·50	143	2½	24	30	3100	2360	121	145	73·2	16
17	6	6	14	6	500	22·50	158	2½	24	30	3300	2480	125	148	78·1	17
18	7	0	14	0	500	26·75	143	2½	25	32	3600	2750	140	165	89·4	18
19	7	0	15	0	600	26·75	173	2½	25	32	4000	3020	150	176	97·3	19
20	7	6	16	3	750	31·50	224	2½	29	34	4800	3650	188	220	120·1	20
21	8	0	16	6	850	37·00	224	2½	31	38	5700	4320	213	256	147·3	21
22	8	6	17	0	1000	41·00	281	2½	34	40	6600	4960	255	304	160·5	22

Note.—The figures in above table give particulars of our Standard Boilers (100 lbs. W.P.)
Boilers up to 4 ft. 9 in. dia. inclusive have dished tops. Boilers above this size have hemispherical tops.
Boilers 4 ft. 3 in. and upwards have funnels fitted with shackles and guy ropes but no stretching screws. The smaller funnels are not guyed.

* Funnels over 15 ft. high are supplied in lengths for shipment, no length exceeding 15 ft. Angles are fitted to the sections for bolting together at destination. All Class B Boilers (*i.e.*, those intended for fitting on board ship) are supplied with a preliminary length of 6 feet of funnel only.

Table showing Prices of Standard Specifications in relation to Specification No. 4.
100 lbs. W.P.

CLASS A. (LAND USE). COAL FIRED.

SIZE OF BOILER				SPECIFICATION 4.	SPECIFICATION 3.				SPECIFICATION 2.						SPECIFICATION 1.					
	Dia.	Ht.	H.S.		Boiler, Spec. 4	Mtgs. (Loose)	Fitting Mtgs	Total.	Boiler, Spec. 4	Mtgs. fitted.	Funnel and Guys.	Outfit.	Pump & Fitting up.	Total.	Boiler, Spec. 4	Mtgs. fitted.	Funnel and Guys.	Outfit.	Injector & Fit-up.	Total.
	Ft In	Ft In	Sq. Ft.	£	£	£	£	£	£	£	£ s.	£ s.	£ s.	£	£	£	£ s.	£ s.	£ s	£
1	3 0	6 9	60	121	121	21	5	147	121	26	4 10	2 10	25	179	121	26	4 10	2 10	5 10	160
2	3 3	7 6	80	127	127	21	5	153	127	26	5 10	2 10	25	186	127	26	5 10	2 10	5 10	167
3	3 9	8 6	100	148	148	21	5	174	148	26	5 10	2 10	25	207	148	26	5 10	2 10	5 10	188
4	4 0	9 0	120	165	165	24	5	194	165	29	6 10	2 10	25	228	165	29	6 10	2 10	6 10	210
5	4 3	9 6	140	183	183	26	6	215	183	32	9 0	2 10	28	255	183	32	9 0	2 10	6 10	233
6	4 6	10 0	160	229	229	26	6	261	229	32	11 0	2 10	28	303	229	32	11 0	2 10	6 10	281
7	4 9	10 3	200	243	243	26	6	275	243	32	13 0	2 10	28	319	243	32	13 0	2 10	9 0	300
8	5 0	11 3	220	274	274	28	6	308	274	34	14 10	2 10	33	358	274	34	14 10	2 10	9 0	334
9	5 3	11 9	250	289	289	29	6	324	289	35	16 10	2 15	33	376	289	35	16 10	2 15	9 0	352
10	5 6	12 3	300	303	303	29	6	338	303	35	17 10	2 15	33	391	303	35	17 10	2 15	9 0	367
11	5 9	13 0	350	349	349	30	7	386	349	37	21 0	2 15	33	443	349	37	21 0	2 15	11 0	421
12	6 0	12 6	350	351	351	31	7	389	351	38	22 0	2 15	33	447	351	38	22 0	2 15	11 0	425
13	6 0	13 6	350	356	356	31	7	394	356	38	22 0	2 15	33	452	356	38	22 0	2 15	11 0	430
14	6 0	14 0	400	369	369	31	7	407	369	38	22 0	2 15	33	465	369	38	22 0	2 15	11 0	443
15	6 6	13 6	450	415	415	33	7	455	415	40	25 0	3 0	39	522	415	40	25 0	3 0	11 0	494
16	6 6	14 0	450	417	417	33	7	457	417	40	25 0	3 0	39	524	417	40	25 0	3 0	11 0	496
17	6 6	14 6	500	430	430	33	7	470	430	40	25 0	3 0	39	537	430	40	25 0	3 0	15 0	513
18	7 0	14 0	500	477	477	34	7	518	477	41	35 0	3 0	39	595	477	41	35 0	3 8	15 0	571
19	7 0	15 0	600	495	495	34	7	536	495	41	35 0	3 0	39	613	495	41	35 0	3 0	15 0	589
20	7 6	16 3	750	599	599	34	7	640	599	41	42 0	3 0	44	729	599	41	42 0	3 0	17 0	702
21	8 0	16 6	850	669	669	42	10	721	669	52	51 0	3 0	44	819	669	52	51 0	3 0	17 0	792
22	8 6	17 0	1000	831	831	42	10	883	831	52	57 0	3 0	44	987	831	52	57 0	3 0	19 0	962

The above Specifications are detailed on page 14, where Code Words will also be found.

Standard Specifications—Class A.

The following indicates the four specifications to which **Standard Cochran Patent Vertical Multitubular Boilers Class A (Land)** can be supplied, depending on Customers' requirements. (See also pages 13 and 15.)

Specification No. 1.—Boiler Complete, with Funnel, Fittings, Mountings, Injector, and Outfit.

Plates and Rivets.—To be of the best quality Siemens-Martin steel (acid open-hearth process). To be in accordance with the British Standard Specification for structural steel for Marine Boilers, and each plate to be tested at the Makers' Works by "Lloyd's" surveyors.

Tubes.—To be of Best Best iron, to be lap-welded, and tested internally to 1000 lbs. per sq. in. by hydraulic pressure.

Fittings.—To be complete, and to comprise the following:—Smokebox, combustion chamber plate and lining, firedoor, manhole and cover, mudholes and doors, one set cast-iron firebars, and plate ashpit damper.

Funnel.—Of steel, of the diameter and height shown in the table on page 12. To be complete with shackles and guy ropes as stated in the table referred to.

Mountings.—To consist of water gauge and protector, 2 test cocks, open lever safety valve, stop valve, feed check valve and shut-off valve combined, pressure gauge and blow-off cock or valve, all as stated in specification of mountings on page 9. The mountings to be fitted in the standard positions as shown on Plan furnished with quotation, unless specially directed otherwise.

Injector.—To be in accordance with the specification on page 9, and to be complete with all the necessary valves and pipes as stated therein. The injector and pipes to be fitted to boiler as shown on Plan.

Outfit.—To comprise the following:—One set of firing tools, one set of spanners, and two tube brushes and one handle.

Specification No. 2.—Boiler Complete, with Funnel, Fittings, Mountings, Feed Pump, and Outfit.

As Specification 1, but Feed Pump in lieu of Injector.

Feed Pump.—To be in accordance with the specification on page 10, and to be complete with all the necessary valves and pipes as stated therein. The pump to be fitted on bracket at base of boiler as shown on Plan.

Specification No. 3.—Boiler with Fittings and Mountings.

Specification No. 4.—Bare Boiler with Fittings only.

NOTE—No Mountings, Funnel, Feed Apparatus, or Outfit included in this Specification.

GENERAL.—The whole of the work to be of the highest class of material and workmanship, and the boiler to be tested under water and steam at the Makers' Works before despatch.

Price List of Standard Sizes showing Code Words.

For details of the Specifications see page 14.

No.	Size of Boiler. Dia.	Height.	H.S.	W.P.	Boilers with Feed Apparatus. **Specification 1.** Boiler with Funnel, Fittings, Mountings, Injector and Outfit. Code Words.	Price.	**Specification 2.** Boiler with Funnel, Fittings, Mountings, Feed Pump and Outfit. Code Words.	Price.	Boilers without Feed Apparatus. **Specification 3.** Boiler with Fittings and Mountings. Code Words.	Price.	**Specification 4.** Boiler with Fittings. Code Words.	Price.	No.
	Ft.In.	Ft. In.	Sq. Ft.			£		£		£		£	
1	3 0	6 9	60	100	Armitage	160	Attraction	179	Attorney	147	Adhesion	121	1
2	3 3	7 6	80	100	Ardath	167	Antrim	186	Alchemyst	153	Active	127	2
3	3 9	8 6	100	100	Alert	188	Alyth	207	Actuary	174	Academy	148	3
4	4 0	9 0	120	100	Adare	210	Aviemore	228	Assurance	194	Abstract	165	4
5	4 3	9 6	140	100	Afton	233	Ambleside	255	Aromatic	215	Ablution	183	5
6	4 6	10 0	160	100	Alderman	281	Alloa	303	Abbot	261	Archangel	229	6
7	4 9	10 3	200	100	Almond	300	Ainsworth	319	Amazon	275	Agrarian	243	7
8	5 0	11 3	220	100	Altercate	334	Ajutage	358	Adversary	308	Agate	274	8
9	5 3	11 9	250	100	Atlas	352	Alborough	376	Apology	324	Amber	289	9
10	5 6	12 3	300	100	Arena	367	Attitude	391	Aristocrat	338	Apricot	303	10
11	5 9	13 0	350	100	*Answer*	421	*Akbar*	443	*Asbestos*	386	*Agitator*	349	11
12	6 0	12 6	350	100	Axminster	425	Addition	447	Astern	389	Alliance	351	12
13	6 0	13 6	350	100	*Arundel*	430	*Abbotsford*	452	*Antagonist*	394	*Anatomy*	356	13
14	6 0	14 0	400	100	Ascot	443	Aberfoyle	465	Advent	407	Atonement	369	14
15	6 6	13 6	450	100	*Anthem*	494	*Army*	522	*Arrival*	455	*Annandale*	415	15
16	6 6	14 0	450	100	Ashford	496	Aldershot	524	Asteroid	457	Asthmatic	417	16
17	6 6	14 6	500	100	Arrears	513	Anfield	537	Ambition	470	Antelope	430	17
18	7 0	14 0	500	100	Ashton	571	Acrostic	595	Ambulance	518	Axiom	477	18
19	7 0	15 0	600	100	Atherton	589	Acrobat	613	Austrian	536	Ally	495	19
20	7 6	16 3	750	100	Atwick	702	Average	729	Alkali	640	Affability	599	20
21	8 0	16 6	850	100	Auckland	792	Arabia	819	Antipodes	721	Armada	669	21
22	8 6	17 0	1000	100	Auldearn	962	Annual	987	Arsenic	883	Atheist	831	22

Above Boilers are built for a working pressure of 100 lbs. per square inch, and tested by hydraulic pressure to double the working pressure. For Boilers above 100 lbs. pressure see page 18.

The above prices are for delivery free on rails Great Britain. Packing for Shipment extra.

Table of Approximate Shipping Weights and Measurements is given on page 26.

NOTE.—Code Word should always be given when describing size of Boiler.

NOTE ALSO.—The sizes in light type are not manufactured for stock, and delivery is generally longer than for other sizes.

SPECIFICATION "B."

(For Marine Use.)

BOILER AND STANDARD MOUNTINGS.

The Boiler to be of the Cochran Patent Class B type.
HEIGHT.. ....., DIAMETER....., HEATING SURFACE....., WORKING PRESSURE.....
constructed as described on page 14.

Funnel.—Of steel, 6 ft. long. Intended as preliminary length only.

Fittings.—To be complete, and to comprise the following :— Smoke box, combustion chamber plate and lining, firedoor, manhole and door, mudholes and doors, and one set cast-iron firebars.

Mountings.—To consist of water gauge and 3 test cocks, double enclosed spring-loaded safety valve, stop valve, 2 feed check valves and shut-off valves combined, blow-off cock or valve, salinometer cock, and pressure gauge complete, all as stated in specification of mountings on page 9. The mountings to be fitted in the standard positions as shown on Plan furnished with quotation, unless specially directed otherwise.

N.B.—No feed apparatus or outfit included in this Specification.

General.—The whole of the work to be of the highest class of material and workmanship, and the boiler to be tested under water and steam at the makers' works before despatch.

A Note on Winch or Donkey Boilers.

It is very important to have the winch boiler large enough. The time a vessel has to remain in port often depends upon the power of its donkey boiler.

The following shows the practice we recommend :—

One	**5**	in. double cylinder winch requires from		**50**	to	**60**	sq. ft. H.S.
,,	**6**	,,	,,	,,	**80** to **100**	,,	,,
,,	**7**	,,	,,	,,	**100** to **120**	,,	,,
,,	**8**	,,	,,	,,	**140** to **160**	,,	,,

The maximum figures should be allowed wherever possible, and in the case of continuous working of coal or grain cargoes even these can be exceeded with advantage.

CLASS B (MARINE). PRICE LIST.

No.	CODE WORD.		SIZE OF BOILER.						Diameter of Funnel.	PRICE.				No.
	With Mountings.	Without Mountings.	Diameter.		Height.		Heating Surface.	Grate Area.		Boiler with Fittings only.	Mtgs. (Loose).	Fitting Mtgs.	Total.	
			Ft.	In.	Ft.	In.	Sq. Ft.	Sq. Ft.	Inches.	£	£	£ s.	£	
1	**Buffalo**	**Bassoon**	3	0	6	9	60	4·75	9	129	34	5 10	169	1
2	**Bambo**	**Bitumen**	3	3	7	6	80	5·75	10	137	34	5 10	177	2
3	**Bramble**	**Buccaneer**	3	9	8	6	100	7·50	11	157	34	5 10	197	3
4	**Bittern**	**Binnacle**	4	0	9	0	120	8·50	12	174	43	5 10	223	4
5	**Ballast**	**Bodkin**	4	3	9	6	140	9·25	13	194	43	6 0	243	5
6	**Barley**	**Brimstone**	4	6	10	0	160	9·75	14	230	43	6 0	279	6
7	**Bravado**	**Barbarian**	4	9	10	3	200	11·75	15	246	43	6 0	295	7
8	**Bombardier**	**Balance**	5	0	11	3	220	12·50	16	276	46	6 0	328	8
9	**Boundary**	**Basilisk**	5	3	11	9	250	14·00	17	293	48	6 0	347	9
10	**Bracket**	**Battlement**	5	6	12	3	300	16·75	18	305	48	6 0	359	10
11	Brigand	Barricade	5	9	13	0	350	18·75	20	354	48	7 0	409	11
12	**Budget**	**Binocular**	6	0	12	6	350	18·75	21	356	50	7 0	413	12
13	Bangle	Blarney	6	0	13	6	350	18·75	21	359	50	7 0	416	13
14	**Bookworm**	**Brickbat**	6	0	14	0	400	18·75	21	372	50	7 0	429	14
15	Bulkhead	Briton	6	6	13	6	450	22·50	24	420	55	7 10	483	15
16	**Bagman**	**Bunker**	6	6	14	0	450	22·50	24	421	55	7 10	484	16
17	**Bugbear**	**Blossom**	6	6	14	6	500	22·50	24	433	55	7 10	496	17
18	**Bantam**	**Backbone**	7	0	14	0	500	26·75	25	484	56	7 10	548	18
19	**Bandit**	**Bachelor**	7	0	15	0	600	26·75	25	499	56	7 10	563	19
20	**Barmaid**	**Bigamist**	7	6	16	3	750	31·50	29	602	56	8 0	666	20
21	**Backwood**	**Blister**	8	0	16	6	850	37·00	31	675	62	11 0	748	21
22	**Blackguard**	**Baltic**	8	6	17	0	1000	41·00	34	839	62	11 0	912	22

Above Boilers are built for a working pressure of 100 lbs. per square inch, and tested by hydraulic pressure to double the working pressure. For Boilers above 100 lbs. pressure see page 18.

The above prices are for delivery free on rails Great Britain, **and include Lloyd's Survey Fees.** Packing for Shipment extra.

Table of Approximate Shipping Weights and Measurements is given on page 26.

NOTE.—Code Words should always be given when describing size of Boiler.

Note also.—The sizes in light type are not manufactured for stock, and delivery is generally longer than for other sizes.

BOILERS FOR PRESSURES HIGHER THAN 100 LBS. PER SQUARE INCH.

Of recent years there has been a growing tendency to use steam at higher pressures than 100 lbs. per sq. inch. Considerable advantages, both in economy and convenience, are obtained, but boilers have to be made correspondingly heavier and stronger.

We have made some stringent tests with our boilers at high pressures, and it has been proved that the Cochran Boiler is well adapted for pressures above 100 lbs. per square inch.

The following Table shows the extra prices for boilers built for certain selected pressures higher than 100 lbs. per sq. inch.

The sizes shown in heavy type are made to stock for the pressures indicated, but for more precise information see our MONTHLY STOCK LIST, which will be forwarded regularly on application.

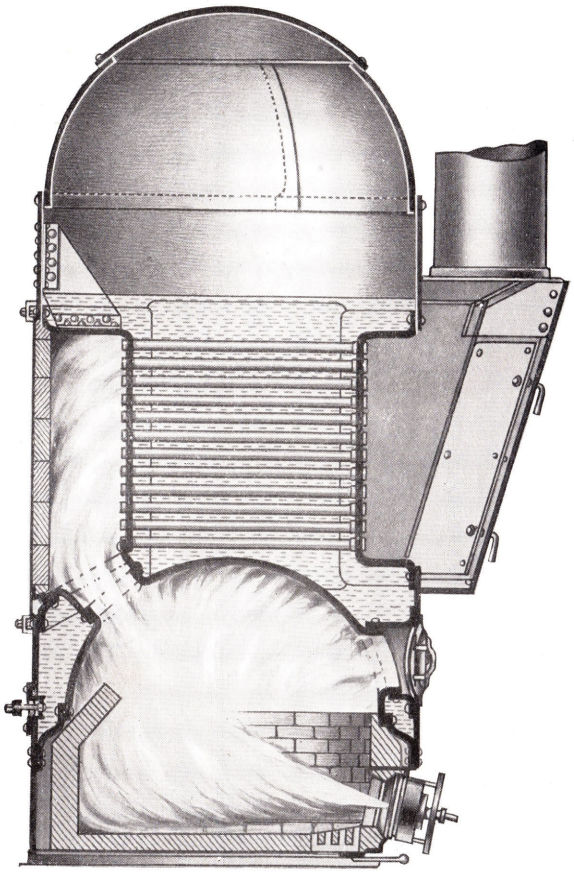
The Code Words shown may be used for describing the pressure required, *e.g.* "Armitage Hynite" means boiler as page 15, but 125 lbs. per sq. inch.

SIZE.				WORKING PRESSURE.—Lbs. per Sq. In.				
			CODE—	**110** HYDAY.	**125** HYNITE.	**135** HYCOT.	**145** HYLAP.	**150** HYPOD.
Diameter.		Height	Heating Surface, approx.	Boiler with Ftgs.	Boiler with Ftgs.	Boiler with Ftgs.	Boiler with Ftgs.	Boiler with Ftgs.
Ft.	In.	Ft. In.	Sq. Ft.	£	£	£	£	£
3	0	6 9	60	5	12	16	18	20
3	3	7 6	80	6	13	17	20	22
3	9	8 6	100	6	14	18	22	24
4	0	9 0	120	7	15	19	24	26
4	3	9 6	140	8	16	20	27	31
4	**6**	**10 0**	**160**	9	**18**	26	34	**38**
4	9	10 3	200	10	20	29	37	42
5	0	11 3	220	11	21	30	38	**43**
5	3	11 9	250	12	22	32	41	46
5	**6**	**12 3**	**300**	13	**23**	36	47	**52**
5	9	13 0	350	14	28	42	54	60
6	0	12 6	350	15	29	43	55	61
6	0	13 6	350	16	30	44	56	**62**
6	0	14 0	400	17	36	46	62	68
6	6	13 6	450	18	38	**54**	**69**	79
6	**6**	**14 0**	**450**	19	39	56	70	**80**
6	**6**	**14 6**	**500**	20	**40**	58	76	87
7	0	14 0	500	22	41	59	78	89
7	**0**	**15 0**	**600**	23	**44**	66	91	**103**
7	6	16 3	750	31	50	72	105	119
8	0	16 6	850	36	56	—	—	—
8	**6**	**17 0**	**1000**	48	**66**	—	—	—

NOTE.—The heating surfaces given above apply to our standard boilers of 100 lbs. working pressure.
In certain sizes these may be slightly curtailed for the higher pressures.

SECTION II.

OIL-FIRED COCHRAN BOILERS.



OIL-FIRED COCHRAN BOILER.

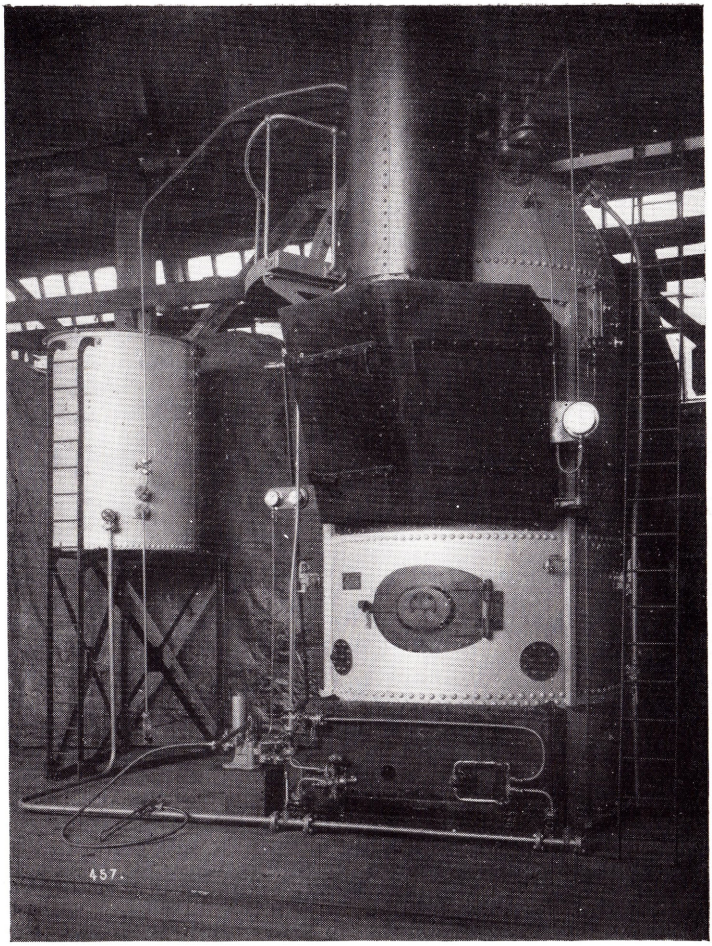
OIL-FIRED COCHRAN BOILERS.

As an Oil-Fired Unit the COCHRAN BOILER has established a world-wide reputation in virtue of its unique design and structural strength. For the conditions of Oil Burning the special SEAMLESS FURNACE and COMBUSTION CHAMBER present the most ideal arrangement, and as supplied for either Land or Marine installations, our present practice is to provide an extension to the bottom shell and a special furnace front for the accommodation of the Oil Firing equipment. This extension to the shell is lined with firebrick as shown in the section on page 20. All the well-known systems of Oil Burning have been fitted to the COCHRAN BOILER, and oil firing can be arranged to take place at any desired position in the circumference of the furnace—that is, at the back, front, or sides. We will be pleased to give our advice upon the best conditions to meet any particular requirements. In considering the question of the oil burners to be used, not only should the intrinsic merits of the type be looked into, but also its suitability to the COCHRAN BOILER, in order to obtain the most economical working. As a policy we suggest that the prospective customer should avail himself of our wide experience, which enables us to design the proper furnace front and fit up the complete equipment, thus ensuring the fullest steaming output with a minimum consumption of oil.

On pages 22 and 23 are illustrations of large COCHRAN BOILERS fitted with KERMODE'S STEAM JET and the WALLSEND-HOWDEN PRESSURE JET PATENT SYSTEMS of Oil-Firing equipment respectively. On a recent trial with an installation similar to the former a thermal efficiency of 74% was obtained, while the gross evaporation per hour considerably exceeded the figure shown for the size of boiler under test (*i.e.*, 5′ 6″ Dia.) shown on page 11, "Heavy Steaming." The trial further emphasised the fact that the COCHRAN BOILER under Oil Firing conditions can evaporate from 13 to 14 lbs. of water per lb. of fuel.

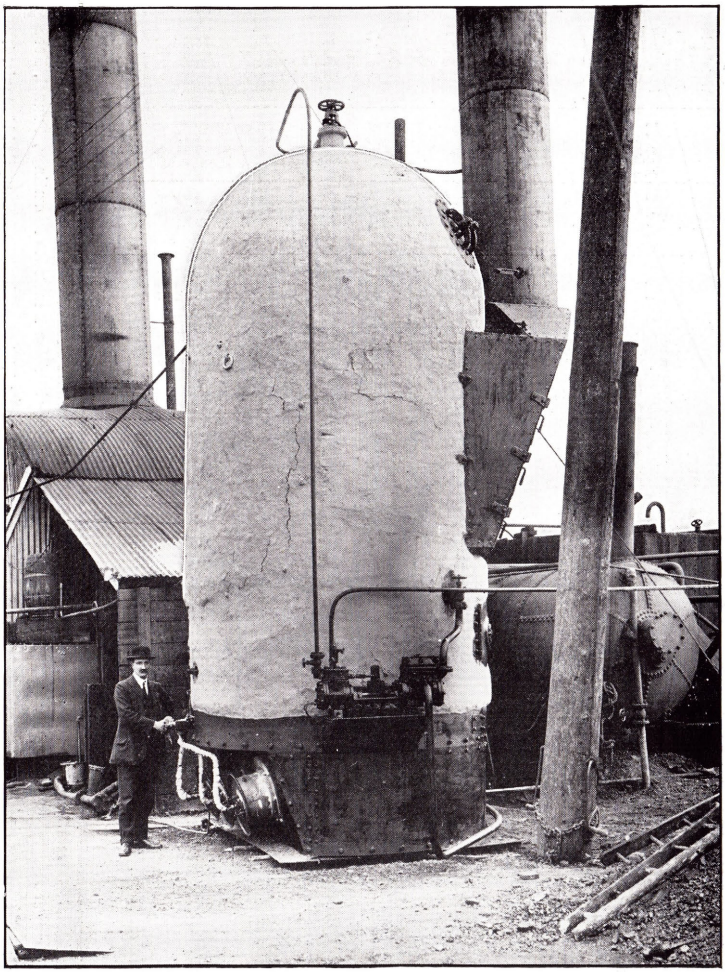
It must be clearly understood that the STOCK COCHRAN BOILER can readily be adapted for Oil Firing by extending the Shell, as shown in the illustrations.

PRICES OF OIL-FIRED COCHRAN BOILERS.—On pages 24 and 25 will be found the prices and important dimensions of Class A and Class B Oil-Fired Boilers. In the case of the Class A (Land) List the Specifications correspond to those detailed on page 14 for Coal-Fired Units, except for the fire grate. The heights shown are those necessitated by the Shell extension above referred to, but in cases where head-room is limited, especially in Marine Installations, it can be arranged to reduce the Steam space slightly or accommodate the Oil Burners through the normal fire hole. This latter arrangement is by no means recommended, in view of the necessity for maximum possible Furnace capacity achieved by the Shell extension.



COCHRAN VERTICAL BOILER, WITH TWO KERMODE'S PATENT STEAM JET BURNERS FIRING THROUGH SHELL EXTENSION.

LAND INSTALLATION.



COCHRAN BOILER SHOWING OIL BURNERS
(WALLSEND-HOWDEN PATENT SYSTEM)
ARRANGED FOR EVAPORATIVE TEST.

No.	Size. Dia.	Size. Ht.	Size. H.S.	Spec. 4, including Smoke Box, Extension to Shell, Furnace Front, and Retarders in Tubes. (No Funnel.)	Funnel and Guys. Dia.	Funnel and Guys. Recommended Height.	Funnel and Guys. Price per Ft. Run.	Funnel and Guys. Total Price.	Spec. 3.	Spec. 2.	Spec. 1.	Weight in Cwts. Boiler to Spec. 3, including Furnace Brickwork, (No Base Plate.)	No.
	Ft. In.	Ft. In.	Sq. Ft.	£	Ins.	Ft.	£ s. d.	£ s.	£	£	£		
1	3 0	8 3	60	153	10	20	0 8 0	8 0	184	217	198	43·5	1
2	3 3	9 0	80	159	11½	22	0 10 6	11 10	190	227	207	50	2
3	3 9	10 0	100	184	13	24	0 11 0	13 5	215	254	234	63·5	3
4	4 0	10 6	120	204	14	25	0 11 0	13 15	238	278	259	73	4
5	4 3	11 0	140	221	15	26	0 12 0	15 10	258	302	280	86·5	5
6	4 6	11 6	160	267	15½	30	0 12 6	18 15	305	352	331	96	6
7	4 9	11 9	200	281	17½	30	0 14 0	21 0	319	368	349	109	7
8	5 0	13 0	220	313	18	35	0 14 0	24 10	353	411	387	124	8
9	5 3	13 6	250	345	19½	40	0 14 0	28 0	386	447	423	141·5	9
10	5 6	14 0	300	349	20½	40	0 14 6	29 0	390	452	428	156	10
11	5 9	14 9	350	401	23½	46	0 15 6	35 15	445	514	492	174	11
12	6 0	14 3	350	402	23½	46	0 15 6	35 15	448	517	495	179	12
13	6 0	15 3	350	407	23½	46	0 15 6	35 15	453	522	500	184·5	13
14	6 0	15 9	400	420	23½	46	0 15 6	35 15	466	535	513	192	14
15	6 6	15 3	450	468	27	46	1 0 0	46 0	517	602	574	214	15
16	6 6	15 9	450	470	27	46	1 0 0	46 0	519	604	576	218	16
17	6 6	16 3	500	484	27	46	1 0 0	46 0	533	618	594	221·5	17
18	7 0	16 0	500	542	28	50	1 1 0	52 10	592	684	660	249·5	18
19	7 0	17 0	600	561	28	50	1 1 0	52 10	611	703	679	261	19
20	7 6	18 6	750	665	32½	56	1 5 0	70 0	716	830	803	311	20
21	8 0	18 9	850	720	35½	60	1 6 0	78 0	783	905	878	361·5	21
22	8 6	19 3	1000	890	39	60	1 6 0	78 0	954	1076	1051	421·5	22

For Approximate Evaporations see Class B Table opposite.

The Furnace arrangement formed by extension to Shell of Boiler, with suitable Furnace Front Plate for reception of Oil Burners.

NOTE.—Specification 1 includes Mountings, Funnel, Injector, and Outfit. Specification 2 includes Mountings, Funnel, Feed Pump, and Outfit. Specification 3 includes Mountings and Outfit.

The above prices do not include a Base Plate in Furnace or the Brickwork Lining, which can be supplied if required.

Prices of Steam, Pressure, or Air Jet Oil Firing Equipment, including Fitting, on application.

For Prices of Mountings, Feed Pump, Injector, see Page 13.

PRICES F.O.R. GREAT BRITAIN.

CLASS B (MARINE). 100 lbs. W.P. OIL-FIRED.

No.	Boiler Dimensions.			Boiler and Fittings, including Smoke Box, Extension to Shell, Furnace Front, Base Plate and Retarders in Tubes. (No Funnel.)	Mountings. (as page 16).		Total.	Approximate Evaporation from and at 212° F. Lbs. per Hour	Weight in Cwts.		No.
	Dia.	Height.	H.S.		Loose.	Fitted.			Boiler with Fittings and Mountings, Base Plate, and Furnace Brickwork.	Water at Working Level.	
	Ft. In.	Ft. In.	Sq. Ft.	£ s.	£	£ s.	£				
1	3 0	8 3	60	170 10	34	5 10	210	430	45	8·9	1
2	3 3	9 0	80	178 10	34	5 10	218	600	51·5	10·3	2
3	3 9	10 0	100	202 10	34	5 10	242	840	65·5	16·9	3
4	4 0	10 6	120	222 10	43	5 10	271	1020	75	20·5	4
5	4 3	11 0	140	241 0	43	6 0	290	1200	89	23·6	5
6	4 6	11 6	160	278 0	43	6 0	327	1320	99	30·3	6
7	4 9	11 9	200	295 0	43	6 0	344	1680	112·5	33·9	7
8	5 0	13 0	220	325 0	46	6 0	377	1820	128	40·6	8
9	5 3	13 6	250	349 0	48	6 0	403	2100	146	43·6	9
10	5 6	14 0	300	361 0	48	6 0	415	2600	161	50·0	10
11	5 9	14 9	350	417 0	48	7 0	472	3000	179·5	56·0	11
12	6 0	14 3	350	419 0	50	7 0	476	3000	184·5	62·2	12
13	6 0	15 3	350	422 0	50	7 0	479	3000	190	62·2	13
14	6 0	15 9	400	445 0	50	7 0	502	3100	198	63·3	14
15	6 6	15 3	450	486 10	55	7 10	549	3700	222	73·2	15
16	6 6	15 9	450	487 10	55	7 10	550	3700	226	73·2	16
17	6 6	16 3	500	500 10	55	7 10	563	4000	229·5	78·1	17
18	7 0	16 0	500	561 10	56	7 10	625	4300	259	89·4	18
19	7 0	17 0	600	578 10	56	7 10	642	4800	270·5	97·3	19
20	7 6	18 6	750	692 0	56	8 0	756	5900	322·5	120·1	20
21	8 0	18 9	850	741 0	62	11 0	814	6800	374·5	147·3	21
22	8 6	19 3	1000	914 0	62	11 0	987	7900	436·5	160·5	22

PRICES INCLUDE LLOYD'S SURVEY FEE. **PRICES F.O.R. GREAT BRITAIN.**

The Furnace arrangement is formed by an extension to the Shell of the Boiler and fitted with Base Plate having air space underneath, also suitable furnace front for Reception of the Burners.

NOTE.—The Firebrick Lining included in the above weights is not covered for in the prices.
Prices of Steam Pressure or Air Jet Oil Firing Equipment, including Fitting, on application.
Packing for Shipment extra.
Code Words for 100 lbs. Boilers as page 17, and above 100 lbs. W.P. as page 18 prefixed by "Oil-Fired."

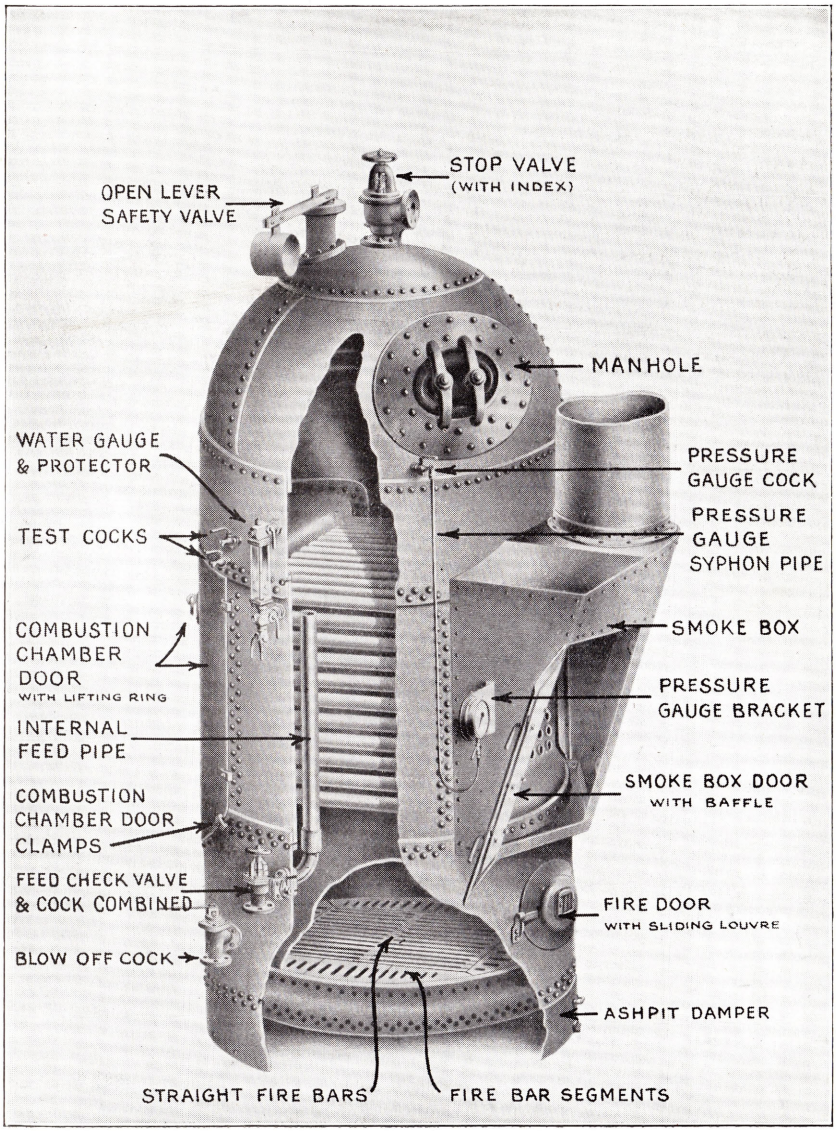
Class A. Specification 2. Coal-Fired.

APPROXIMATE SHIPPING WEIGHTS AND MEASUREMENTS.

No.	Size of Boiler. Dia.		Size of Boiler. Hgt.		BOILER. Linear Dimensions.					Cubic Feet.	Cwts. at 40 c. ft. per ton	Dead-weight Cwts.	CASE. Linear Dimensions.						Cubic Feet.	Cwts. at 40 c. ft. per ton.	Dead-weight Cwts.	FUNNEL. Linear Dimensions.						Cubic Feet.	Cwts. at 40 c. ft. per ton.	Dead-weight Cwts.	No.
	Ft	In	Ft	In	Ft	In	Ft	In	Ft	In				Ft	In	Ft	In	Ft	In				Ft	In	Ft	In	Ft	In				
1	3	0	6	9	3	3	3	3	6	11	73	36	23	4	10	2	9	2	4	31	15	9¼	1	0	1	0	11	3	11	6	1½	1
2	3	3	7	6	3	6	3	6	7	8	94	47	25	4	10	3	0	2	4	34	17	10	1	2	1	2	12	3	17	9	1¾	2
3	3	9	8	6	4	0	4	0	8	8	139	69	32	4	10	2	10	2	4	32	16	11½	1	3	1	3	13	3	21	11	2	3
4	4	0	9	0	4	3	4	3	9	2	165	82	38	4	10	3	4	2	8	43	21	15½	1	4	1	4	14	3	25	13	2¼	4
														3	4	1	6	1	10	9	4											
5	4	3	9	6	4	6	4	6	9	8	196	98	45	5	5	3	7	2	8	52	26	15¼	1	5	1	5	15	3	31	16	2¾	5
6	4	6	10	0	4	9	4	9	10	2	230	115	50	5	5	3	9	2	8	54	27	16¾	1	6	1	6	16	7	37	19	3¼	6
7	4	9	10	3	5	0	5	0	10	5	260	130	55	5	5	3	11	2	10	60	30	18½	1	7	1	7	18	7	46	23	4¾	7
8	5	0	11	3	5	3	5	3	11	5	315	157	65	5	0	4	0	3	0	60	30	19½	1	8	1	8	20	7	58	29	6½	8
9	5	3	11	9	5	6	5	6	11	11	360	180	73	5	1	4	4	3	2	70	35	20¾	1	9	1	9	22	7	68	34	7	9
10	5	6	12	3	5	9	5	9	12	5	410	205	82	5	1	4	6	3	2	72	36	22	1	11	1	11	24	7	90	45	8	10
11	5	9	13	0	6	0	6	0	13	2	474	237	95	5	6	4	10	3	6	93	46	25¼	2	0	2	0	26	7	106	53	9¼	11
12	6	0	12	6	6	3	6	3	12	8	494	247	96	5	3	4	11	3	7	93	46	26	2	0	2	0	28	7	114	57	9¾	12
13	6	0	13	6	6	3	6	3	13	8	533	266	100	5	3	4	11	3	7	93	46	26	2	1	2	1	28	7	124	62	9¾	13
14	6	0	14	0	6	3	6	3	14	2	553	276	107	5	8	4	11	3	7	100	50	27½	2	1	2	1	28	7	124	62	10¼	14
15	6	6	13	6	6	9	6	9	13	8	622	311	116	5	9	5	7	4	2	140	70	32⅔	2	5	2	5	30	7	178	89	12¾	15
16	6	6	14	0	6	9	6	9	14	2	645	322	121	5	9	5	7	4	2	140	70	32½	2	5	2	5	30	7	178	89	12¾	16
17	6	6	14	6	6	9	6	9	14	8	668	334	125	6	1	5	7	4	2	142	71	33	2	5	2	5	30	7	178	89	12¾	17
18	7	0	14	0	7	3	7	3	14	2	745	372	140	6	0	5	10	4	4	152	76	35½	2	6	2	6	33	0	206	103	17½	18
19	7	0	15	0	7	3	7	3	15	2	797	398	150	6	6	5	10	4	4	164	82	35¾	2	6	2	6	33	0	206	103	17½	19
20	7	6	16	3	7	9	7	9	16	5	985	492	190	7	3	6	4	4	10	222	111	39¼	2	10	2	10	35	0	280	140	21½	20
21	8	0	16	6	8	3	8	3	16	9	1140	570	220	7	9	6	7	5	0	255	127	49½	3	0	3	0	39	0	350	175	32	21
22	8	6	17	0	8	9	8	9	17	3	1320	660	255	8	1	8	0	6	0	388	194	59¾	3	3	3	3	41	0	432	216	37¼	22

The above Shipping Weights and Measurements are sufficiently accurate to estimate freight on Standard Boilers under Specication No. 2 on page 14. The Weights and Measurements for Specification No. 1 are practically the same as those given above but boilers supplied under Specification Nos. 3 and 4 have no funnel and the cases are slightly smaller. Specification "B" has 6 ft. of funnel and the cases are practically the same as for No. 3. Boilers and funnels are shipped unpacked. Funnels over 15 ft. high are supplied in lengths for shipment, no length exceeding 15 ft. If made telescopic a considerable saving in freight can be effected, but the cost of Funnel will be somewhat increased. The cases contain smokebox, mountings, and other attachments to the boiler. In the three largest sizes of Boilers measurements of cases can be reduced if smokeboxes are partially taken to pieces for packing.

Section of Standard Cochran Boiler showing appearance and Positions of Normal Fittings and Mountings.



A NOTE ON THE

Cochran Hot-Water Boiler

FOR HEATING AND SERVICE SUPPLY.

The features of design and the structural strength of the Cochran Boiler has made its application to Hot-Water Heating Schemes a particularly successful one when compared with Cast-iron Sectional Boilers for the smaller schemes, and the built-in types where large installations are warranted.

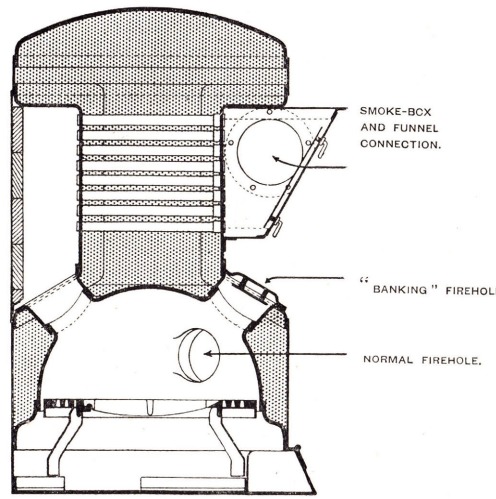
The section here shown is typical of the design most favoured by interested authorities as introducing an extra firehole to meet "Banking" conditions.

It is important to note that the Smokebox of the Cochran Boiler enables the funnel to be led off in any desired direction relative to an existing brick flue.

The following table indicates the range of popular sizes and principal dimensions, but boilers of intermediate sizes can be supplied corresponding with the 22 sizes to which the Standard Cochran Boiler is manufactured.

The transmission factor on which the figures in the last two columns are based is 6500 B.T.U. per hour per sq. foot heating surface, reckoned on a two-hourly stoking interval in the case of boilers with two fireholes.

NOTE.—In the case of Stock Hot-Water Boilers, the position of the normal Firehole is immediately below the "Banking" firehole. If specially required to suit conditions in the Boiler House, these Boilers can be built with the normal firehole in any position within 90° on either side of a Vertical plane through the "Banking" hole.



SECTION.

No. of Boiler	Diam. of Boiler.		Height of Boiler.		Approx. Heating Surface.	Grate Area.	Ratio. H.S. / G.A.	Code Word.	B.T.U. per Hour. Heating.	Gallons per Hour from 50°-180° F.
	Ft.	In.	Ft.	In.	Sq. Ft.	Sq. Ft.				
1	3	0	6	0	50	4.78	9.8	Hotfoot	305,500	235
3	3	9	6	9	95	7.5	12.6	Hotwell	617,500	475
5	4	3	7	6	140	9.25	15.1	Hotham	910,000	700
6	4	6	8	4	165	9.75	16.7	Hotline	1,059,500	815
8	5	0	9	4	225	12.5	18.0	Hotfire	1,469,000	1130
10	5	6	9	9	310	16.75	18.4	Hotpot	2,008,500	1545
15	6	6	11	1	455	22.5	20.1	Hotnob	2,951,000	2270
19	7	0	12	3	635	26.75	23.7	Hotback	4,127,500	3175
20	7	6	13	6	755	31.5	23.9	Hotcake	4,894,500	3765
21	8	0	14	0	950	37.0	25.6	Hotscent	6,175,000	4750
22	8	6	14	5	1145	41.0	27.8	Hotscotch	7,423,000	5710

We will be glad to investigate the boiler aspect of your heating problems, and submit our keenest quotation for any one of the above boilers or intermediate sizes, and submit a design showing return and flow connections, &c. The Cochran Hot-Water Boiler is as efficient and durable a unit as the Standard Steam Boiler. It requires no brickwork setting, and should be included in every scheme calling for highest workmanship and simplicity.